

WHAT IS CLAIMED IS

1. A method for accessing results data in a distributed computing environment,
5 comprising:

a client sending a first message in a data representation language to a service
accessible through the distributed computing environment;

10 the service generating first results in response to the first message;

generating a first results gate configured to provide an interface to the first results
through messages in the data representation language; and

15 the client accessing the first results through the first results gate.

2. The method as recited in claim 1, wherein the client comprises a client process
and a client gate, wherein said sending a first message comprises:

20 the client gate receiving from the client process a request for the service to perform
a function on behalf of the client process; and

the client gate sending the first message to the service in response to said receiving
a request.

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3. The method as recited in claim 2, wherein said generating a first results gate is
performed by the client gate.

4. The method as recited in claim 2, further comprising the client gate attaching an
30 authentication credential to the first message prior to said sending the first message,
wherein the authentication credential identifies the client;

5. The method as recited in claim 4, wherein the first results gate is configured to attach the authentication credential to outgoing messages.

5 6. The method as recited in claim 2, further comprising:

providing the first results gate to the client process as results of the function.

7. The method as recited in claim 1, wherein the first message includes information
10 requesting the service to perform a function, and wherein said generating first results comprises:

the service performing the function; and

15 generating the first results as output of said performing the function.

8. The method as recited in claim 7, wherein the client comprises a client process and a client message gate, the method further comprising:

20 the service storing the first results;

wherein said generating a first results gate comprises the client message gate receiving a second message in the data representation language, wherein the second message includes an address of the stored first results; and

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wherein said generating a first results gate is performed by the client message gate in accordance with information for generating the first results gate obtained through the address.

006T01-101900

wherein said sending a first message, said generating first results, and said generating a first results gate are performed without client process intervention.

5 15. The method as recited in claim 13, wherein said generating results comprises:

the service executing a computer programming language method in accordance with the information representing the computer programming language method call included in the first message; and

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generating the first results as output of said executing a method.

16. The method as recited in claim 13, wherein the client comprises a client method gate, wherein said sending a first message comprises:

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the client method gate receiving the computer programming language method call from a first process executing within the client; and

the client method gate generating the first message for the first process.

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17. The method as recited in claim 16, further comprising:

the service storing the first results;

25 wherein said generating a first results gate comprises the client method gate receiving a second message in the data representation language, wherein the second message includes an address of the stored first results, wherein said generating a first results gate is performed by the client method gate in accordance with information for generating the first results gate
30 obtained through the address.

18. The method as recited in claim 17, wherein the service is comprised on a first device, wherein the first device further comprises a space service, and wherein the service storing the first results comprises the service storing the first results to the space service.

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19. The method as recited in claim 17, wherein the service is comprised on a first device, wherein the service storing the first results comprises the service storing the first results on a space service in the distributed computing environment and external to the first device.

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20. The method as recited in claim 16, further comprising the client method gate receiving a second message in the data representation language in response to said generating first results, wherein said generating a first results gate is performed by the client method gate in response to said receiving a second message.

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21. The method as recited in claim 20, further comprising the client method gate providing information for accessing the first results through the first results gate to the first process.

22. The method as recited in claim 1, wherein the first results is comprised in a first computer programming language object, wherein the first results object further comprises one or more computer programming language access methods for accessing the first results, wherein the one or more access methods are invocable through one or more computer programming language access method calls, and wherein said accessing the first results through the first results gate comprises:

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the first results gate receiving from a first process executing within the client a first access method call of the one or more access method calls, wherein the first method call is associated with a first access method of the one or more access methods;

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005707-101900

the first results gate sending a second message in the data representation language to a second results gate, wherein the second message includes a data representation language representation of the first access method call; and

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the second results gate invoking the first access method in accordance with the representation of the first access method call included in the second message.

10 23. The method as recited in claim 22, further comprising:

the second results gate sending a third message in the data representation language to the first results gate, wherein the third message includes first access method results; and

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the first results gate providing the first access method results to the first process.

24. The method as recited in claim 23, wherein the first access method results includes the first results.

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25. The method as recited in claim 23, wherein said providing the first access method results to the first process comprises generating a third results gate configured to provide an interface to the first access method results through messages in the data representation language.

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26. The method as recited in claim 1, wherein said accessing the first results through the first results gate comprises:

006T0T-709E960

the first results gate receiving from a first process executing within the client a first computer programming language method call, wherein the first method call is associated with a first method for accessing the first results;

5 the first results gate sending a second message in the data representation language to a second results gate in response to receiving the first method call, wherein the second message includes a request for the first results; and

the second results gate sending a third message in the data representation language to the first results gate, wherein the third message includes the requested first results.

27. The method as recited in claim 1, wherein the client is executing within a virtual machine, wherein the virtual machine is executing within a client device in the distributed computing environment.

28. The method as recited in claim 27, wherein the virtual machine is a Java Virtual Machine (JVM).

29. The method as recited in claim 1, wherein the data representation language is eXtensible Markup Language (XML).

30. A distributed computing system comprising:
a service device configured to generate results for clients of the service device;
a client device configured to send a first message in a data representation language to the service device;

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wherein the service device is further configured to generate first results in response to the first message;

wherein the client device is further configured to:

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generate a first results gate configured to provide an interface to the first results through messages in the data representation language; and

access the first results through the first results gate.

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31. The system as recited in claim 30, wherein the client device comprises a client process and a client gate unit, wherein, in said sending a first message, the client gate unit is configured to:

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receive from the client process a request for the service device to perform a function on behalf of the client process;

send the first message to the service device in response to said receiving a request; and

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provide the first results gate to the client process as results of the function.

32. The system as recited in claim 31, wherein said generating a first results gate is performed by the client gate unit.

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33. The system as recited in claim 31, wherein the client gate unit is further configured to attach an authentication credential to the first message prior to said sending the first message, wherein the authentication credential identifies the client process, wherein the first results gate is configured to attach the authentication credential to outgoing messages.

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34. The system as recited in claim 30, wherein the first message includes information requesting the service device to perform a function on behalf of the client device, and wherein, in said generating first results, the service device is further configured to:

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performing the function; and

generate the first results as output of said performing the function.

10 35. The system as recited in claim 34,

wherein the client device comprises a client process and a client message gate,

wherein the service device is further configured to store the first results;

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wherein the client message gate is configured to receive a second message in the data representation language, wherein the second message includes an address of the stored first results;

20 wherein said generating a first results gate is performed by the client message gate for the client device in accordance with information for generating the first results gate obtained through the address.

36. The system as recited in claim 35, wherein the service device comprises a space service, and wherein the service device storing the first results comprises the service storing the first results to the space service.

37. The system as recited in claim 35, further comprising:

30 a space device comprising a space service;

wherein, in said storing the first results, the service device is further configured to store the first results to the space service.

5 38. The system as recited in claim 35, wherein the client message gate is further configured to receive a second message in the data representation language from the service subsequent to said generating the first results, wherein said generating a first results gate is performed by the client message gate in response to said receiving a second message.

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39. The system as recited in claim 38, wherein the client message gate is further configured to provide information for accessing the first results through the first results gate to the client process.

15 40. The system as recited in claim 30, wherein the first message includes information representing a computer programming language method call, wherein the service device comprises one or more computer programming language methods executable within the service device and wherein one of the methods executable within the service device corresponds to the method call included in the first message.

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41. The system as recited in claim 40,

wherein the client device comprises a client process configured to generate the method call;

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wherein said sending a first message, said generating first results, and said generating a first results gate are performed without client process intervention.

42. The system as recited in claim 40, wherein, in said generating results, the service device is further configured to:

5 execute a computer programming language method in accordance with the information representing the computer programming language method call included in the first message; and

wherein the first results are generated as output of said executing a method.

10 43. The system as recited in claim 40, wherein the client device comprises a client method gate, wherein, in said sending a first message, the client method gate is configured to:

15 receive the computer programming language method call from a first process executable within the client device; and

generate the first message for the first process.

20 44. The system as recited in claim 43,

wherein the service device is further configured to store the first results;

25 wherein, in said generating a first results gate, the client method gate is further configured to:

receive a second message in the data representation language, wherein the second message includes an address of the stored first results; and

30 generate the first results gate in accordance with information for generating the first results gate obtained through the address.

45. The system as recited in claim 44, wherein the service device further comprises a space service, and wherein, in said storing the first results, the service device is further configured to store the first results to the space service.

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46. The system as recited in claim 44, further comprising:

a space device comprising a space service;

10 wherein, in said storing the first results, the service device is further configured to store the first results to the space service.

47. The system as recited in claim 43, wherein the client method gate is further configured to receive a second message in the data representation language from the service in response to said generating first results, wherein said generating a first results gate is performed by the client method gate in response to said receiving a second message.

48. The system as recited in claim 47, wherein the client method gate is further configured to provide information for accessing the first results through the first results gate to the first process.

49. The system as recited in claim 30, further comprising:

25 a second results gate;

wherein the first results is comprised in a first computer programming language object, wherein the first results object further comprises one or more computer programming language access methods for accessing the first

00603681-101900

results, wherein the one or more access methods are invokable through one or more computer programming language access method calls;

wherein, in said accessing the first results, the first results gate is configured to:

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receive from a first process executing within the client device a first access method call of the one or more access method calls, wherein the first method call is associated with a first access method of the one or more access methods;

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send a second message in the data representation language to the second results gate, wherein the second message includes a data representation language representation of the first access method call; and

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wherein the second results gate is configured to invoke the first access method in accordance with the representation of the first access method call included in the second message.

50. The system as recited in claim 49,

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wherein the second results gate is further configured to send a third message in the data representation language to the first results gate, wherein the third message includes first access method results; and

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wherein the first results gate is further configured to provide the first access method results to the first process.

51. The system as recited in claim 50,

wherein, in said providing the first access method results to the first process, the first results gate is further configured to generate a third results gate;

wherein the third results gate is configured to provide an interface to the first access method results through messages in the data representation language.

52. The system as recited in claim 30, further comprising:

a second results gate;

wherein, in said accessing the first results through the first results gate, the first results gate is further configured to:

receive from a first process executing within the client a first computer programming language method call, wherein the first method call is associated with a first method for accessing the first results; and

send a second message in the data representation language to the second results gate in response to receiving the first method call, wherein the second message includes a request for the first results; and

wherein the second results gate is configured to send a third message in the data representation language to the first results gate, wherein the third message includes the requested first results.

53. The system as recited in claim 30, wherein the client device comprises a virtual machine, and wherein said send a first message, generate a first results gate, and access the first results through the first results gate are performed within the virtual machine execution environment.

54. The system as recited in claim 53, wherein the virtual machine is a Java Virtual Machine (JVM).

5 55. The system as recited in claim 30, wherein the data representation language is eXtensible Markup Language (XML).

56. A device comprising:

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a first gate unit configured to

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send a first message in a data representation language to a service accessible through a distributed computing environment, wherein the service is operable to generate first results in response to the first message;

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generate a first results gate, wherein the first results gate is configured to provide an interface to the first results through messages in the data representation language; and

a client component configured to access the first results through the first results gate.

25 57. The device as recited in claim 56, wherein said sending a first message and said generating a first results gate are performed without client component intervention.

58. The device as recited in claim 56, wherein, in said sending a first message, the first gate unit is further configured to:

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comprises one or more computer programming language methods, and wherein one of the methods corresponds to the method call included in the first message.

63. The device as recited in claim 56, wherein the first results are generated as output
5 of the method corresponding to the method call included in the first message.

64. The device as recited in claim 56, wherein, in said sending a first message, the first gate unit is further configured to:

10 receive the computer programming language method call from the client component; and

generate the first message for the client component.

15 65. The device as recited in claim 64, wherein, in said generating a first results gate, the first gate unit is further configured to:

receive a second message in the data representation language, wherein the second message includes an address of the first results; and

20 generate the first results gate in accordance with information for generating the first results gate obtained through the address.

25 66. The device as recited in claim 64, wherein the first gate unit is further configured to receive a second message in the data representation language from the service, wherein said generating a first results gate is performed by the first gate unit in response to said receiving a second message.

67. The device as recited in claim 66, wherein the first gate unit is further configured to provide information for accessing the first results through the first results gate to the client component.

5 68. The device as recited in claim 56,

wherein the first results is comprised in a first computer programming language object, wherein the first results object further comprises one or more computer programming language access methods for accessing the first results, wherein the one or more access methods are invokable through one or more computer programming language access method calls;

wherein, in said accessing the first results, the first results gate is configured to:

15 receive from the client component a first access method call of the one or more access method calls, wherein the first method call is associated with a first access method of the one or more access methods;

20 send a second message in the data representation language to a second results gate, wherein the second message includes a data representation language representation of the first access method call; and

25 wherein the second results gate is configured to invoke the first access method in accordance with the representation of the first access method call included in the second message.

69. The device as recited in claim 68, wherein the first results gate is further configured to:

00693681-101900

receive a third message in the data representation language from the second results gate, wherein the third message includes first access method results produced by the second results gate invoking the first access method in accordance with the representation of the first access method call included in the second message; and

provide the first access method results to the client component.

10 70. The device as recited in claim 69,

wherein, in said providing the first access method results to the client component, the first results gate is further configured to generate a third results gate;

15 wherein the third results gate is configured to provide an interface to the first access method results through messages in the data representation language.

20 71. The device as recited in claim 56, wherein, in said accessing the first results, the first results gate is further configured to:

receive from the client component a first computer programming language method call, wherein the first method call is associated with a first method for accessing the first results; and

25 send a second message in the data representation language to a second results gate in response to receiving the first method call, wherein the second message includes a request for the first results ; and

receive a third message in the data representation language from the second results gate, wherein the third message includes the requested results.

72. The device as recited in claim 56, wherein the data representation language is
5 eXtensible Markup Language (XML).

73. A carrier medium comprising program instructions, wherein the program instructions are computer-executable to implement:

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a client sending a first message in a data representation language to a service accessible through the distributed computing environment;

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the service generating first results in response to the first message;

generating a first results gate configured to provide an interface to the first results through messages in the data representation language; and

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the client accessing the first results through the first results gate.

74. The carrier medium as recited in claim 73, wherein the client comprises a client process and a client gate, wherein, in said sending a first message, the program instructions are further computer-executable to implement:

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the client gate receiving from the client process a request for the service to perform a function on behalf of the client process; and

the client gate sending the first message to the service in response to said receiving a request; and

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providing the first results gate to the client process as results of the function.

75. The carrier medium as recited in claim 74, wherein said generating a first results gate is performed by the client gate.

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76. The carrier medium as recited in claim 74, wherein the program instructions are further computer-executable to implement the client gate attaching an authentication credential to the first message prior to said sending the first message, wherein the authentication credential identifies the client, and wherein the first results gate is configured to attach the authentication credential to outgoing messages.

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77. The carrier medium as recited in claim 73, wherein the first message includes information requesting the service to perform a function on behalf of the client, and wherein, in said generating first results, the program instructions are further computer-executable to implement:

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the service performing the function; and

generating the first results as output of said performing the function.

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78. The carrier medium as recited in claim 73, wherein the client comprises a client process and a client message gate, and wherein the program instructions are further computer-executable to implement:

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the service storing the first results;

wherein, in said generating a first results gate, the program instructions are further computer-executable to implement the client message gate receiving a second message in the data representation language, wherein the second message includes an address of the stored first results; and

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00693681-101900

wherein said generating a first results gate is performed by the client message gate
in accordance with information for generating the first results gate
obtained through the address.

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79. The carrier medium as recited in claim 78, wherein the program instructions are
further computer-executable to implement:

the client message gate receiving a second message in the data representation
10 language from the service in response to said generating first results,
wherein said generating a first results gate is performed by the client
message gate in response to said receiving a second message; and

the client message gate providing information for accessing the first results
15 through the first results gate to the client process.

80. The carrier medium as recited in claim 73, wherein the first message includes
information representing a computer programming language method call, wherein the
service comprises one or more computer programming language methods executable
20 within the service, and wherein one of the methods executable within the service
corresponds to the method call included in the first message.

81. The carrier medium as recited in claim 80, wherein, in said generating results, the
program instructions are further computer-executable to implement:

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the service executing a computer programming language method in accordance
with the information representing the computer programming language
method call included in the first message; and

30 generating the first results as output of said executing a method.

82. The carrier medium as recited in claim 80, wherein the client comprises a client method gate, wherein, in said sending a first message, the program instructions are further computer-executable to implement:

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the client method gate receiving the computer programming language method call from a first process executing within the client; and

the client method gate generating the first message for the first process.

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83. The carrier medium as recited in claim 82,

wherein the program instructions are further computer-executable to implement the service storing the first results; and

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wherein, in said generating a first results gate, the program instructions are further computer-executable to implement:

the client method gate receiving a second message in the data representation language, wherein the second message includes an address of the stored first results, wherein said generating a first results gate is performed by the client method gate in accordance with information for generating the first results gate obtained through the address.

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84. The carrier medium as recited in claim 82, wherein the program instructions are further computer-executable to implement:

the client method gate receiving a second message in the data representation language in response to said generating first results, wherein said

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generating a first results gate is performed by the client method gate in response to said receiving a second message; and

the client method gate providing information for accessing the first results through the first results gate to the first process.

85. The carrier medium as recited in claim 73, wherein the first results is comprised in a first computer programming language object, wherein the first results object further comprises one or more computer programming language access methods for accessing the first results, wherein the one or more access methods are invokable through one or more computer programming language access method calls, and wherein, in said accessing the first results through the first results gate, the program instructions are further computer-executable to implement:

the first results gate receiving from a first process executing within the client a first access method call of the one or more access method calls, wherein the first method call is associated with a first access method of the one or more access methods;

the first results gate sending a second message in the data representation language to a second results gate, wherein the second message includes a data representation language representation of the first access method call; and

the second results gate invoking the first access method in accordance with the representation of the first access method call included in the second message.

86. The carrier medium as recited in claim 85, wherein the program instructions are further computer-executable to implement:

the second results gate sending a third message in the data representation language to the first results gate, wherein the third message includes first access method results; and

5 the first results gate providing the first access method results to the first process.

87. The carrier medium as recited in claim 86, wherein, in said providing the first access method results to the first process, the program instructions are further computer-executable to implement generating a third results gate configured to provide an interface to the first access method results through messages in the data representation language.

88. The carrier medium as recited in claim 73, wherein, in said accessing the first results through the first results gate, the program instructions are further computer-executable to implement:

15 the first results gate receiving from a first process executing within the client a first computer programming language method call, wherein the first method call is associated with a first method for accessing the first results;

20 the first results gate sending a second message in the data representation language in response to receiving the first method call, wherein the second message includes a request for the first results ; and

the second results gate sending a third message in the data representation language to the first results gate, wherein the third message includes the requested results.

89. The carrier medium as recited in claim 73, wherein the data representation language is eXtensible Markup Language (XML).

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